CHAPTER: 6
MANUFACTURE OF
STERILE PREPARATIONS

BY
Mrs. K. SHAILAJA., M. PHARM.,
LECTURER
DEPT OF PHARMACY PRACTICE,
SRM COLLEGE OF PHARMACY
A LARGE SIZED HOSPITAL DEALS WITH CRITICAL PATIENTS IN ADDITION TO OTHERS.

IN THE CRITICAL PATIENTS IT IS VERY IMPORTANT TO USE PARENTERAL PREPARATIONS THAT ARE REQUIRED IN EMERGENCY. THE TIME AND QUALITY IS OF UTMOST IMPORTANCE.

IT IS THUS OF GREAT IMPORTANCE THAT PRODUCT SECURITY AND EFFICIENCY OF PRODUCTION WITH RESPECT TO PARENTERAL PREPARATIONS IS ENSURED.
SOME IMPORTANT PARENTERAL PREPARATIONS ARE

- ADMIXTURES
- FLUIDS AND ELECTROLYTES
  - DEXTROSE
  - SODIUM CHLORIDE
  - WATER
  - RINGERS SOLUTIONS
- ELECTROLYTE PREPARATIONS
  - CATIONS
  - ANIONS
- DIALYSATES
  - PERITONEAL DIALYSIS
  - HEMODIALYSIS
• **IRRIGATING SOLUTIONS**
  - TOPICAL ADMINISTRATION
  - INFUSION OF IRRIGATING SOLUTIONS

• **PARENTERAL ANTINEOPLASTIC AGENTS**

• **PATIENT PROBLEMS DURING ADMINISTRATION OF ANTINEOPLASTICS**
  - INFUSION PHLEBITIS (inflammation of a vein)
  - EXTRAVASATION (infiltration of a drug into a subcutaneous tissues surrounding the vein).
TERMINOLOGY FOR QUALITY PRODUCTS

- **STERILITY**: absence of living microorganisms
- **STERILE PRODUCTS**: pharmaceutical dosage forms which are sterile
- **ASEPTIC TECHNIQUE**: procedures to maintain the sterility of such dosage forms
- **PARENTERAL PREPARATIONS**: pharmaceutical dosage forms that are injected through one or more layers of skin
- **PYROGENS**: are metabolic by-products of living or dead cause a pyrogenic response (fever) upon injection.
TONOCITY: refers to the tone of a solution and is directly related to the osmotic pressure exerted by the solute.

- **ISOTONIC SOLUTIONS**: 0.9% sodium chloride.
- **HYPERTONIC SOLUTIONS**: greater than 0.9% sodium chloride.
- **HYPOTONIC SOLUTIONS**: lower than 0.9% sodium chloride.
MANUFACTURE OF PARENTERAL PREPARATIONS WHICH ARE TERMINALLY STERILISED

STERILE PRODUCT AREA: DESIGN AND FUNCTION:

- CLEAN ROOM:
  THESE AREAS ARE SPECIALLY CONSTRUCTED FILTERED AND MAINTAINED TO PREVENT ENVIRONMENTAL CONTAMINATION OF STERILE PRODUCTS

- LAMINAR FLOW IS OF TWO TYPES:
  - Horizontal laminar flow hoods
  - Vertical laminar flow hoods

- INSPECTION AND CERTIFICATION
• **STERILISING AREA:**

• **USER AREA:** FOR SHORT TERM HOLDING OF BATCHES BEFORE AND AFTER STERILISATION

• **SERVICE AREA:**
  FOR STERILIZER DURING MAINTENANCE AND REMOVAL OF THE CHAMBER LAGGING FOR ROUTINE INSURANCE SURVEY PURPOSES, STEAM, WATER, ETC SHOULD BE LAGGED

• **INSPECTION AND LABELLING ZONE:** FOR OPTIMUM DETECTION OF VISIBLE PARTICULATE CONTAMINATION BUT ALSO FOR ADEQUATE INSPECTION

• **LABEL BUREAU OF OVERPRINTING:** BATCH NUMBERING AND OVERPRINTING OF LABELS SHOULD BE ALONE HERE
• **QUARENTIUM STORE**: For the batches in process should be arranged here like a drug store

• **CHANGING FACILITIES FOR A SOCIALLY CLEAN AREA**: Many of the basic principles will be clearing of clearing area and aseptic area also apply to socially clean area

• **TESTING PROCEDURES**: Various types of tests are used to ensure that all sterile products are free microbial contamination pyrogens and particulate matter
• **STERILITY TESTING**: Ensures that the process used to sterilize the product was successful.

• **PYROGEN TESTING**: By means of qualitative fever response test in rabbits and an invitro limulus test is often difficult to conduct because of lack of facilities.

• **CLARITY TESTING**: It is used to check sterile products of particulate matter.
QUALITY CONTROL AND ASSURANCE

- **QUALITY CONTROL** is the day to day assessment of all operations from the receipt of raw material to the material to the distribution of the finished product, including analysis testing of the finished product.

- **QUALITY ASSURANCE** is an oversight function, involves the auditing of quality control procedure and systems, with suggestions for changes as needed.
METHODS OF STERILIZATION

- **STERILIZATION** is performed to destroy or remove all microorganisms in or on a product.

- **THERMAL STERILIZATION** involves the use of either moist or dry heat.

- **MOIST HEAT STERILIZATION**: Heating the objects in boiling water. By this method microorganisms are destroyed by cellular protein coagulation.

- **DRY HEAT STERILIZATION**: It is appropriate for materials that cannot withstand moist heat sterilization.

- **CHEMICAL STERILIZATION**: Is used to sterilize surface and porous material. Ethylene oxide is generally used in combination with heat & moisture.
- **RESIDENTIAL GAS MUST BE ALLOWED TO DISSIPATE AFTER STERILIZATION**

- **RADIATION STERILIZATION**: SUITABLE FOR INDUSTRIAL STERILIZATION OF CONTENTS OF SEALED PACKAGES THAT CANNOT BE EXPOSED TO HEAT

- **PACKAGING OF PARENTRAL PRODUCTS:**

  **TYPES OF CONTAINERS:**
  **AMPULES**: OLDEST TYPE OF PARENTRAL PRODUCTS CONTAINERS (MADE UP OF GLASS)
  **VIALS**: GLASS OR PLASTIC CONTAINERS; CLOSED WITH A RUBBER STOPPER SEALED WITH ALUMINIUM CRIP
  **PRE-FILLED SYRINGES AND CARTRIDGES**: FOR QUICKEST ADMINISTRATION
INFUSION SOLUTION

• TWO CATEGORIES:
  • SMALL VOLUME PARENTRALS (SVP)- VOLUME LESS THAN 100 ML
  • LARGE VOLUME PARENTRALS (LVP)- VOLUME 100 ML OR GREATER

• PACKAGING MATERIAL:
  • INCLUDES GLASS AND PLASTIC POLYMERS
  • GLASS: ORIGINAL, PARENTRAL PACKAGING MATERIAL HAS SUPERIOR CLARITY
  • PLASTIC POLYMERS: USED FOR PARENTRAL PACKAGING INCLUDE POLYVINYL CHLORIDE AND POLYOLEFIN
  • FLEXIBLE AND NON RIGID- POLYVINYL CHLORIDE
  • POLYOLEFIN- SEMI RIGID
Thank You